How successfully does the new Duncan-Aiton version fill this need? The lack of any serious notes greatly marred Duncan's edition of Copernicus' *On the Revolutions*, but Aiton's present contribution has ensured that the same criticism cannot be leveled here. His commentary identifies classical allusions, explicates sometimes obscure mathematics, and provides a good selection of literature citations. I do think readers should have been more clearly reminded that the original editions included a reprint of Rheticus' *Narratio prima* and a long appendix by Michael Maestlin, the latter now being available in an English translation by A. Grafton in the American Philosophical Society *Proceedings* (1973).

The translation itself is literal without being clumsy. Whenever an expression seems to ring not quite true, it can be checked against the original Latin on the facing page. A colleague has shown me a dozen typed sheets of errata, but these are for the most part nuances that are sometimes interesting but generally not essential to an appreciation of the text.

My chief complaint concerns neither the translation nor the notes, but the format of the book. The publisher has chosen to reduce Kepler's 1621 folio edition onto a textbook-sized page; this results in some very small type, and part of the translation is like reading the proverbial fine print of an insurance contract. Furthermore, since the Latin text was reproduced from a photocopy rather than an original or a good microfilm, the facsimile is a travesty, and pages 90 and 122 win top prizes for ugliness. This is all the more sad because Kepler himself has such a well-developed sense of typography and even boasted on the title page of his *Tabulae Rudolphinae* that he owned the number type from which the tables were printed.

## MATHEMATICAL DISCOVERIES: 1600-1750. By P. L. Griffiths. Ilfracombe, England (Stockwell). 1977. 121 pp. £2.75

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This curious little book is not what its title suggests: an account of discoveries in mathematics during the seminal century and a half when mathematics as we know it today arose and took shape. Although each of the 17 chapters of the book has a title of the form *How X discovered (or solved or constructed) Y*--for example, *How James Gregory discovered his arctan formula in 1671*--the reader is given neither a narrative of how the discovery was made nor an analysis of the historical antecedents and consequences of the discovery. Instead, each chapter consists almost entirely of a derivation: how a given finding was first presented (or might have been presented) as a deduction from earlier work. Needless to say, such a derivation does not necessarily follow the line of reasoning used in making the original discovery.

The mathematicians whose work is represented in the book are Jacques Bernoulli, Roger Cotes, Leonhard Euler, James Gregory, Edmund Halley, John Machin, Nicolaus Mercator, Abraham De Moivre (7 chapters), John Napier, Isaac Newton (2 chapters), James Stirling, and John Wallis. There is no introduction, bibliography, or index. In only a few chapters are source materials cited. Thus the reader can only conjecture how much of a derivation is a rendering into modern notation of the original and how much is an imaginative construction. The book is replete with errors (Euler's constant is termed "the Gamma function"), misleading statements (Napier is apparently to be credited with using a formula for $e^{-x}$ in constructing his tables of logarithms), and misprints. Editorial guidance appears to have been minimal.

Behind the discoveries mentioned in the book lie stories of remarkable creative endeavor: Napier's formulation of logarithms in terms of progressions and his reformulation in terms of continuous motion; Wallis' bold use of reasoning by analogy in arriving at his infinite product; De Moivre's finding of the normal curve while studying games of chance. Such stories are difficult to tell clearly and compellingly, and they need to be told anew in each generation. But logical derivations are not history. To be taken by the hand through a deductive chain of formulas to a discovery is to miss both how the discovery came to be made in the first place and why the discoverer might have been led to make it.

## A HISTORY OF THE CALCULUS OF VARIATIONS FROM THE 17TH THROUGH THE 19TH CENTURY. By Herman H. Goldstine. New York (Springer-Verlag). 1980. Studies in the History of Mathematics and Physical Sciences 5, xvii + 410 pp.

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The calculus of variations has developed in two general stages. Its first stage, the geometric, originated in studies of isoperimetrical problems by ancient Greek geometers. The geometric method prevailed until the invention of the infini-